

Appl. No. : **10/827,179**
Filed : **April 19, 2004**

REMARKS

The specification and claim 4 have been amended to correct a misspelled term. Claims 8-16 have been withdrawn from further consideration as being directed to a none-elected species. New claims 17-18 have been added. Support for claim 18 can be found in Examples 1-4, and 7, for example. Support for claim 19 can be found in Example 1-7, for example. Claims 17 and 18 are dependent upon and readable on the elected species.

No new matter has been added in the amendments. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

Affirmation of Restriction Requirement

Applicant affirms the provisional election of Group I, claims 1-7.

Claim Objection

Claim 4 has been objected to because of a misspelled term “polyglycelol” in line 2. The spelling has been corrected to --polyglycerol--, thereby obviating this objection.

Specification Objection

The specification has been objected to because of a misspelled term “polyglycelol” on page 9, line 9. The spelling has been corrected to --polyglycerol--, thereby obviating this objection.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kamisuki et al.(US6,899,974) in view of Johnson (US3,776,779).

With regard to claim 1, the Office Action states: “it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Kamisuki et al., because Johnson teaches using **an additive** to stabilize the gel created and in an effort to **improve the battery performance or life** (column 4, lines 20-24).” (Emphasis added).

Appl. No. : 10/827,179
Filed : April 19, 2004

However, contrary to the above interpretation, in Johnson, the “additive” to stabilize the gel created and in an effort to improve the battery performance or life is **not a polymeric compound** having an atom with an unpaired electron in its principal chain. Johnson states:

Sulfuric acid as used in an electrolyte of this invention is conventional sulfuric acid of the type commonly used in known lead-acid batteries. Such acid may contain extremely minor or trace quantities of contaminants such as are normally present in acid utilized in such batteries. In addition, **such acid** may contain minor quantities of **other ingredients** such as are occasionally added to the electrolytes in lead-acid cells in an effort to improve the battery performance or life provided that **such secondary additives** do not interfere with the action of the silica and **the polyglycol** utilized in accordance with this invention. *Column 4, lines 15-26* (emphasis added).

In Johnson, the secondary additives, **not** the polyglycol, are occasionally added to improve the battery performance or life. The interpretation of Johnson in the Office action is inconsistent with a fair reading of Johnson, and thus, there is no sound basis for this rejection.

In Johnson, the purposes of adding a polyethylene glycol polymer are described as below.

In accordance with this invention an improvement in **a sulfuric acid electrolyte gelled with silica** is achieved through the use of a comparatively small or minor amount of a polyglycol polymer, preferably a polyethylene glycol polymer, as an additive to **stabilize the gel created as a result of the use of the silica** so that the gel is substantially **non-thixotropic, solid-like** in character and is of such a nature that it will **not significantly shrink, crack or otherwise breakdown** during continued, repeated use. *Column 3, lines 11-20* (emphasis added).

The electrolyte of Johnson is a sulfuric acid electrolyte gelled with silica, which is chemically very different from a proton-transfer type electrochemical cell (which is also unrelated to silica) wherein the polymeric compound functions as an electron-transfer promoter. Further, the above reasons to use a polyglycol polymer in Johnson are unrelated to the electrochemical cell recited in claim 1.

The Supreme Court of the United States states: “Although common sense directs caution as to a patent application claiming as innovation the combination of two known devices according to their established functions, it can be important to identify a **reason** that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does.” *KSR International Co. v. Teleflex, Inc.*, 550 U. S. ____ (2007) (emphasis added). As explained above, Johnson provides no reason to use a polyglycol polymer in a proton transfer type electrochemical cell.

Appl. No. : **10/827,179**
Filed : **April 19, 2004**

Further, the surprising effects of significant improvement on the capacity and cycle life of the battery due to the electron-transfer promoter (the polymeric compound recited in claim 1) are shown in the Examples of the instant specification (see e.g., table 1 on page 19).

The Supreme Court of the United States also states: “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* Here, in view of the significant improvements on the capacity and cycle life of the battery due to the polymeric compound recited in claim 1, the use of the polymeric compound recited in claim 1 does yield much more than predictable results based on Johnson and Kamisuki.

Accordingly, claim 1 cannot be *prima facie* obvious over Kamisuki and Johnson, and this determination is consistent with the Supreme Court statements. The remaining claims are dependent upon claim 1, and at least for this reason, the remaining claims also cannot be obvious over Kamisuki and Johnson. Applicant respectfully requests withdrawal of this rejection.

Claims 1-7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishiyama et al.(US6,300,015) in view of Johnson. The Office Action states that it would have been obvious to one of ordinary skill in the art to use a polymeric compound having an atom with an unpaired electron in its principal chain with the electrolytic solution of Nishiyama et al., because Johnson teaches using an additive to stabilize the gel created and in an effort to improve the battery performance or life (column 4, lines 20-24). As explained above, Johnson does not provide a reason to combine the polymeric compound in a proton transfer type electrochemical cell, and the use of the polymeric compound recited in claim 1 does yield much more than predictable results. Accordingly, claim 1 cannot be *prima facie* obvious over Nishiyama and Johnson. The remaining claims are dependent upon claim 1, and at least for this reason, the remaining claims also cannot be obvious over Nishiyama and Johnson. Applicant respectfully requests withdrawal of this rejection.

New Claims

New claims 17-18 have been added.

Claim 17 further recites “a content of the polymeric compound is 0.1 to 30 wt% to the electrolytic solution”. Johnson specifically teaches about 0.065 to about 0.0001 wt% of a polyglycol (column 6, lines 1-8). Table 1 on page 19 of the instant specification shows that the

Appl. No. : **10/827,179**
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0.1 wt% content (Example 4) is great improvement over the 0.005 wt% content (Example 5), for example. Johnson does not teach, rather teaches away from, the range recited in claim 17. The other prior art references are irrelevant to the above feature.

Claim 18 further recites “the electrolytic solution consists of the proton-source-containing electrolyte and the polymeric compound having the atom with the unpaired electron in its principal chain as the electron-transfer promoter”. The gelled battery electrolyte of Johnson requires silica whereas the electrolyte of claim 18 does not. Thus, Johnson does not teach, rather teaches away from, the limitation recited in claim 18. The other prior art references are irrelevant to the above feature.

CONCLUSION

In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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